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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/010,525

12/06/2001

Robert S. Chau

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Michael A. Bernadicou
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP
Seventh Floor
12400 Wilshire Boulevard
Los Angeles, CA 90025-1030

EXAMINER

VU, QUANG D

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 04/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/010,525

Applicant(s)

CHAU ET AL.

Examiner

Quang D Vu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 December 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 30,32,36 and 37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 30,32,36 and 37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>12/22/03</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

2. Claims 30 and 36 are rejected under 35 U.S.C. 102(e) as being anticipated by US Patent No. 5,571,744 to Demirlioglu et al.

Regarding claim 30, Demirlioglu et al. (figures 1-12) teach a method of forming a semiconductor device comprising:

forming a gate electrode (26) having a first thickness on a gate dielectric layer (24) formed on a substrate;

forming a pair of source/drain regions (46) on opposite sides of the gate electrode (26);
forming a silicon germanium film (36) having a second thickness on the gate electrode (26);

forming a silicon germanium film (36) having the second thickness on the source/drain regions (46);

forming a silicide layer (50) having a third thickness on the silicon germanium films (36);
and

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forming a pair of sidewall spacers (30) having a height (a height measured from a top portion of sidewall spacer to a bottom portion of sidewall spacer which is in direct contact with the source/drain region) above (the height of sidewall spacers is higher than the height of the silicide layer) the third thickness of the silicide layer on the silicon germanium film on the gate electrode (see figure 12).

Regarding claim 36, Demirlioglu et al. teach the gate electrode (26) comprises polysilicon (column 3, line 42).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 32 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 5,571,744 to Demirlioglu et al. in view of US Patent No. 5,168,072 to Moslehi.

Regarding claim 32, Demirlioglu et al. differ from the claimed invention by not showing the sidewall spacers (30) comprise silicon nitride. However, Moslehi teaches the sidewall spacers (60) comprise silicon nitride (figure 5; column 12, line 60 – column 13, line 5). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teaching of Moslehi into the method taught by Demirlioglu et al., since the nitride spacer defines the dimensions of the gate and prevents

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impurities from coming directly into the channel. Additionally, it prevents any bridging between the source/drain regions and the gate.

Regarding claim 37, Demirlioglu et al. differ from the claimed invention by not showing the sidewall spacers are less than 300 angstroms in width. It would have been obvious to one having ordinary skill in the art at the time the invention was made for the sidewall spacers are less than 300 angstroms in width, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Response to Arguments

Applicant's arguments filed 07/28/03 have been fully considered but they are not persuasive.

It is argued, in page 4 of the remarks, that Demirlioglu et al. do not teach or suggest forming a pair of sidewall spacers having height above the third thickness of the silicide layer on the silicon germanium film on the gate electrode. This argument is not convincing because Demirlioglu et al. teach forming a pair of sidewall spacers (30) having a height (a height measured from a top portion of sidewall spacer to a bottom portion of sidewall spacer which is in direct contact with the source/drain region) above (the height of sidewall spacers is higher than the height of the silicide layer) the third thickness of the silicide layer on the silicon germanium film on the gate electrode (see figure 12).

It is argued, in page 4 of the remarks, that Demirlioglu et al. and Moslehi do not teach or suggest the claimed invention of claims 32 and 37. This argument is not convincing because the

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combined device (Demirlioglu et al. and Moslehi) shows the claimed invention of claims 32 and 37 for the reasons that are discussed above.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quang D Vu whose telephone number is 571-272-1667. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on 571-272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

qv
April 1, 2004

Steven Loke
Primary Examiner